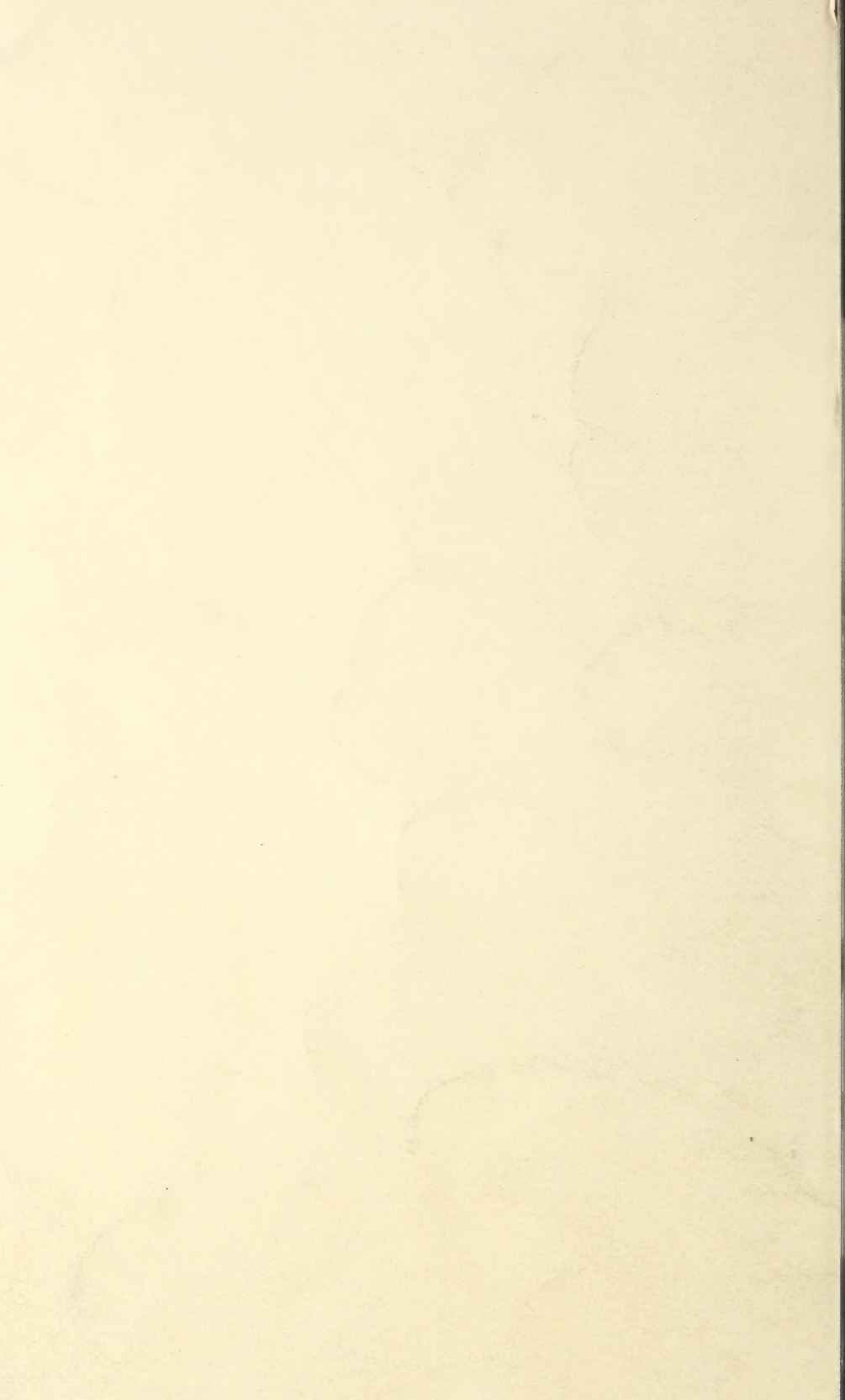


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CRIMSON CLOVER



LEAFLET No. 160

U. S. DEPARTMENT *of* AGRICULTURE

CRIMSON CLOVER

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Growth and Distribution

Crimson clover (*Trifolium incarnatum*) is the most important winter annual legume of the central section of the Eastern States (fig. 1). Besides being an excellent hay plant and furnishing an abundance of early spring pasture, it affords protection to the soil during the fall, winter, and spring, prevents soil washing, and pro-

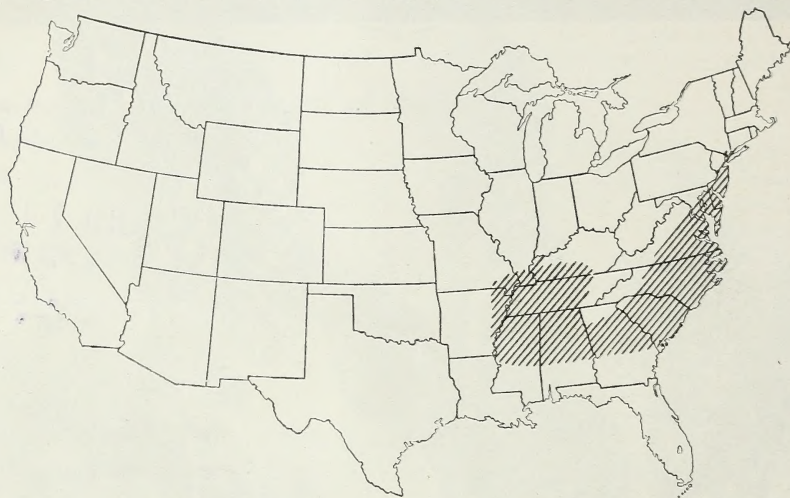


FIGURE 1.—Principal crimson clover region of the United States.

vides green manure for soil improvement. This legume has the distinct advantage of being a heavy producer of seed, which can be easily harvested and sown without the use of expensive machinery.

Crimson clover is a native of Europe and is widely grown in France, Hungary, and other central and southern European countries. Seed was introduced into this country as early as 1819, but it was not until 1880 that the plant became of agricultural importance. During the last 6 years the annual commercial consumption of seed in the United States has ranged from 2 to 4 million pounds. In addition, large quantities of home-grown seed are used and handled from farm to farm.

The common name of this clover is derived from the distinctive bright crimson color of the blossoms. Other common names, such as German clover and scarlet clover, are frequently heard in different localities. In general the leaves and stems of crimson clover resemble red clover, but are distinguished by the rounding of the tips of the leaves and a greater covering of hair on both leaves and stems. When it is planted in the fall the leaves develop from the crown and form a rosette, which enlarges whenever weather conditions are favorable. In late spring flower stems develop rapidly and terminate their growth with elongated flower heads. Seed forms and the plant dies with

the advent of hot summer weather. The seed is yellow, slightly larger, and more rounding than red clover seed.

Adaptation

Crimson clover is adapted to cool, humid weather and is tolerant of winter conditions where the temperature does not become severe or too variable. In this region (fig. 1) it should be planted in late summer or early fall, since early establishment and growth are favorable to its winter survival. It will thrive on both sandy and clay soils and is tolerant of ordinary soil acidity. On extremely poor soils, stands are difficult to obtain and the growth is stunted. The use of manure and phosphate fertilizers on such soils will improve the chances of obtaining good stands.

Crimson clover may also be successfully grown as a summer annual in Maine, northern Michigan, and Minnesota. The winter culture of this clover may be extended into Kentucky, southern Missouri, and southern Indiana provided the seed is sown in fertile soil early in August. Production may be successfully extended southward with an increase of soil fertility and with seeding delayed until soil-moisture conditions are favorable.

Seedbed Preparation

The most important and difficult phase of successful production of crimson clover is getting a stand. Sufficient soil moisture to germinate the seed and to establish the seedlings is the greatest factor in obtaining a stand, which when established usually produces a good crop.

Seedlings are usually made in late August or early September between the rows of cultivated crops. Under such conditions an ideal seedbed is difficult to prepare, therefore careful preparation is necessary. Furthermore, the crop plants in the row shade the clover seedlings and seriously compete with them for the available moisture. Increasing the distance between the rows and planting the row crop more thinly will afford better opportunity for the establishment of the clover. When planted between the rows of other crops, the seed is usually broadcast on the surface and covered by cultivating or harrowing (fig. 2). Drilling the seed after the soil surface has been stirred will usually give more complete stands than broadcasting, and it may be done with a small one-horse drill. The seed should not be planted more than one-half to three-fourths of an inch deep, respectively, in clay and sandy soils.

Crimson clover is often seeded following a grain crop, and this is a surer method of establishing a stand than planting between the rows of cultivated crops, providing the seedbed is well prepared. After the grain crop is removed the soil is plowed or disked and allowed to settle. This is followed by light harrowing or disking when necessary to kill weed seedlings. Before the clover is seeded the soil should be firmly packed, because a loose cloddy seedbed is the forerunner of failure. The seed may be either drilled or broadcast, but drilling will give more uniform stands.

Fertilizers

When the crop is planted on extremely poor soils, good stands and growth cannot be expected. Such soil conditions may be improved by the application of manure and phosphate fertilizers or by turning

under such crops as cowpeas, soybeans, or lespedeza. In many soils of low fertility the use of 50 to 100 pounds per acre of a nitrogen fertilizer will encourage early seedling growth and establishment. On the fertile soils of this region crimson clover may be successfully grown without fertilizer, but on most soils applications of 200 pounds of phosphate fertilizer per acre are profitable in obtaining stands and vigorous growth (fig. 3). The use of potash is recommended when a deficiency is known to exist.

Seed Sources

Of the total amount of seed normally used approximately 60 percent is of foreign origin, coming principally from Hungary and France. Most of the domestic crimson clover seed offered on the market is produced in south-central Tennessee. While white-flowered strains



FIGURE 2.—Seeding crimson clover in corn.

and others differing in maturity have been isolated, they are little used. Claims have been made that locally grown seed is superior to seed from other sources including that of foreign origin. Further experiments are needed to determine whether such differences actually exist.

Rate and Time of Seeding

Under ordinary conditions 15 to 18 pounds of hulled seed will give good stands unless there is a deficiency of soil moisture. Depending upon the amount of foreign material 45 to 60 pounds of unhulled seed is comparable to a 15-pound seeding rate of hulled seed. Crimson clover may be sown from the middle of August until October 1 with the expectation of securing a good stand. The later it is seeded the less growth can be expected and the more readily winterkilling occurs. The early establishment of the plants becomes more important as plantings are extended northward. Seeding crimson clover, if possible, either immediately before or following heavy rains will increase its chances of making a stand. The spring planting of crimson clover

in or south of the Corn Belt usually results in a short, stunted growth followed by meager blossoming and an unprofitable yield.

Inoculation

In many parts of the crimson clover region it is not necessary to inoculate the seed; but if clover has not been successfully grown on a soil, inoculation of the seed is good insurance. If the plants are not inoculated they will develop slowly, become yellow, and die. Inoculated plants are able to obtain about two-thirds of their nitrogen from the air through their root nodules. The plants may be artificially inoculated by applying pure cultures of the bacteria to the seed or by scattering soil from a field where inoculated crimson clover has been grown. Two hundred to three hundred pounds per acre of such soil evenly distributed at seeding time is sufficient.

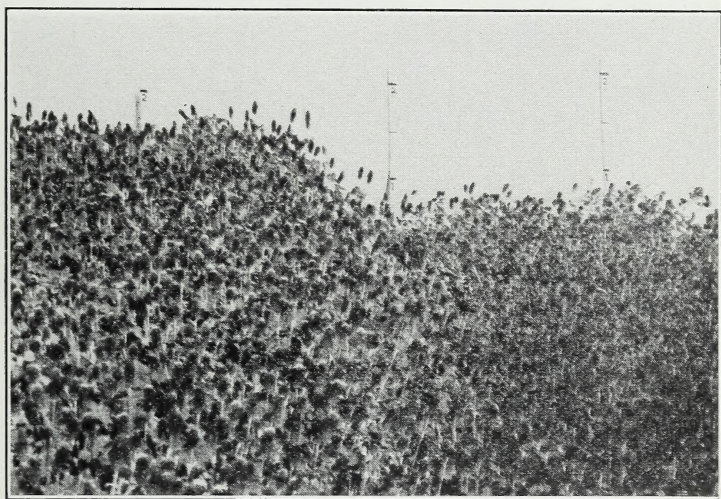


FIGURE 3.—Effect of phosphate application on good soil: Treated (left); untreated (right).

Unhulled Seed

The use of unhulled seed offers the distinct advantage of increasing the chance of obtaining thick stands. With the prevalence of dry soil conditions, light rainfall does not cause the unhulled seed to germinate, but hulled seed germinates readily and the seedlings may die from lack of moisture before they can become established.

Its bulky nature makes unhulled seed more difficult to distribute uniformly than hulled seed. It must be broadcast and may be harrowed in. It is also difficult to market and is not generally handled by the seed trade. But farmers can harvest seed for their own use and save the expense of having it hulled.

Companion Crops

Rye, vetch, Italian ryegrass, and fall-sown grain crops are often seeded with crimson clover. Besides making a valuable addition to the clover (fig. 4), these companion crops help bolster up a thin stand. Such crops are seeded from one-half to one-third the normal crop rate and the crimson clover is seeded at the normal rate. Planting is done

at the same time, but, as a greater depth is required for most of the seed of the companion crops, two seeding operations are necessary. In Tennessee, farmers often use a mixture of 5 pounds of red clover and 10 pounds of crimson clover per acre with excellent results. The first growth of the mixture may be grazed or harvested for hay or for crimson clover seed, while the second crop is wholly red clover.

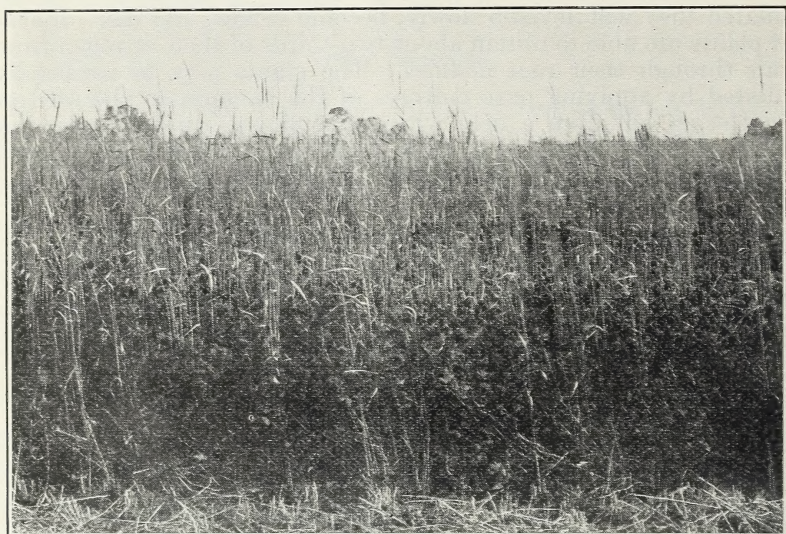


FIGURE 4.—Crimson clover and rye, an excellent green-manure combination.

Diseases and Insects

The only serious disease that affects crimson clover is stem rot. The effect of this disease is seen in the early spring and is characterized by the plants dying in patches. The stems rot at the surface of the soil or where they join the crown. The occurrence of continued damp cool weather during early spring favors the development of the disease. Exclusion of clover and other legumes from the rotation for a period of 2 to 5 years is the best control method.

Sandy soils in the southern part of the crimson clover belt are often infested with nematodes. Nematode injury results in a stunting and yellowing of the plants and is most prevalent in the southern part of the region. While the clover-seed chalcid, the pea aphid, and other insects sometimes become numerous in crimson clover, insects do not ordinarily cause appreciable damage.

Utilization

Crimson clover grows rapidly in early spring and furnishes an abundance of early grazing (fig. 5). If planted early and an abundant fall growth is made, the clover may also be grazed during the fall and winter months. Such a practice has been successfully followed in Tennessee, where crimson clover has provided the winter pasturage. The grazing, however, should be restricted to periods when the soil is relatively dry, otherwise damage may result from trampling. Animals grazing on crimson clover seldom bloat; however, it is advisable

not to turn them into clover fields for the first time when they are hungry. Bloat is less likely to occur when a mixture of clover and grass or grain is grazed than when the clover alone is grazed. As crimson clover reaches maturity the hairs of the heads and stems become hard and tough. When grazed continuously or when fed as hay at this stage of maturity large masses of the hairs are liable to form into hair balls in stomachs of horses and mules. Occasionally the hair balls are responsible for the death of animals. If small amounts of other feeds, particularly roughages, are fed along with the clover, the formation of these balls will be reduced. Cattle, sheep, and swine do not seem to be affected.

Crimson clover makes excellent hay when cut at the early bloom stage although the yield may be slightly reduced. For maximum



FIGURE 5.—Crimson clover provides an abundance of early spring grazing.

yields it should be harvested in full bloom. The hay is easily cured either in the swath or in the windrow. Fewer leaves are lost and less bleaching occurs in windrowed hay. Although yields as high as $2\frac{1}{2}$ tons per acre are not uncommon on fertile soil, $1\frac{1}{2}$ to 2 tons is an ordinary production.

Crimson clover is an ideal green-manure crop. For the best result it should be plowed under 2 to 3 weeks before planting the succeeding crop. This gives sufficient time for decomposition, which is rapid unless the crop is mature when plowed under. Occasionally, strips are plowed in which row crops are planted, allowing the clover between the plowed strips to mature. Seed may be harvested by hand from the clover between the row crop, and the remaining clover straw allowed to mat and serve as a mulch, or the entire plant may be permitted to form a mulch. A volunteer seeding may be secured in this way, especially in the northern part of this region, but attempts to follow such a practice should be tried on a small scale until experience is gained. When used in orchards, crimson clover is often allowed to mature, after which it is disked into the soil. Occasionally a volunteer seeding may be obtained in the fall.

Seed Production

Crimson clover is a prolific seed-producing plant and yields of 5 to 10 bushels per acre are common, depending upon the thickness of the stand, the amount of growth that is produced, and the care exercised in harvesting the seed. The florets are self-fertile, but bees are effective in tripping and transferring the pollen, with a consequent increase in the number of seed per head. The placing of colonies of honeybees adjacent to blooming fields will effectively increase pollination. More seed is usually produced on soils of medium fertility than on rich soils, since fertile soils seem to stimulate the growth of stems and leaves at the expense of flower-head development.

Large yields and ease of harvesting crimson clover seed are the principal reasons why crimson clover is such an ideal legume crop.

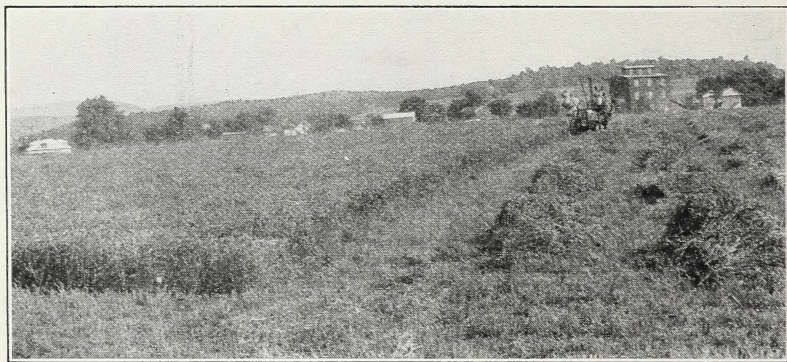


FIGURE 6.—Cutting a crimson clover seed crop with a mower equipped with a bunching attachment.

Farmers may save seed with very little expense other than their own labor. When the seed heads are mature they readily shatter and are easily harvested either by hand stripping or by using horse-drawn homemade strippers. One bushel of unhulled seed contains about 2 pounds of hulled seed, and although bulky in nature, it can be easily stored on the farm until fall.

When the seed is mature the crop is cut with a mower, which may be equipped with a bunching or windrowing attachment (fig. 6) or it may be harvested with a combine. During wet seasons difficulties in combining the seed from standing plants may be experienced. Under such conditions the plants may be cut and windrowed and then threshed by the combine from the windrow. As crimson clover shatters easily when ripe, cutting with the mower when the heads are damp with dew or rain is recommended. If allowed to stand too long after it is ripe a beating rain will shatter much of the seed. After a few days of curing, the seed is hulled with an ordinary clover huller or a grain separator equipped with hulling attachments. The less the clover is handled, the less seed will be lost by shattering.

Troublesome weeds are encountered in growing crimson clover seed; field peppergrass (*Lepidium campestre*) and wintercress (*Barbarea praecox*) are probably the worst, as their separation from the clover seed is difficult. Little barley (*Hordeum pusillum*) is objectionable in unhulled seed, and the use of unhulled seed will naturally increase the prevalence of this weed.

